U.S. FISH AND WILDLIFE SERVICE
COLUMBIA RIVER GORGE
NATIONAL FISH HATCHERY COMPLEX

FISCAL YEAR 2012 ANNUAL REPORT
CARSON NATIONAL FISH HATCHERY
CARSON, WASHINGTON

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Introduction

Carson National Fish Hatchery (NFH) is located 12 miles north of the town of Carson, Washington in Skamania County within the Wind River watershed. Carson NFH sits on approximately 20 acres at the confluence of Tyee Creek and the Wind River within the Gifford Pinchot National Forest. The hatchery is relatively easy to get to by driving east on State Route 14 from Vancouver, Washington to Carson, Washington. The hatchery is located at mile post 14 along the Wind River Highway, about 12 miles north of the town of Carson. Approximate driving time from the Portland Airport is one hour and 15 minutes.

Carson NFH was authorized by 50 STAT. 220 May 28, 1937 and started operation in 1938 rearing and releasing trout and fall Chinook salmon to mitigate for the effects of federal water projects on the Columbia River. The hatchery was reauthorized by the Mitchell Act (16 USC 755-757; 52 Stat. 345) on May 11, 1938 and amended on August 8, 1946. Over the years, the Carson NFH production program has included a variety of fish species such as: rainbow trout, Yellowstone cutthroat, brook trout, coho salmon, sockeye salmon and kokanee, spring and fall Chinook salmon. Since 1981 Carson NFH has focused on spring Chinook salmon.

Historically, there were no wild salmon runs in the Wind River due to Shipherd Falls which acted as an impassable fish barrier about two miles upstream from the confluence of the Wind and Columbia Rivers. A fish ladder was constructed in 1955 to allow passage over Shipherd Falls. After installation of the fish ladder, the hatchery was remodeled and expanded. All of this was done as part of the Columbia River Fishery Development Program in an attempt to establish a run of spring Chinook salmon into the Wind River.

Since spring Chinook are not native to the Wind River, approximately 500 spring Chinook salmon were trapped annually from 1955 through 1964 at the Bonneville Dam on the Washington side of the Columbia River and transported to the holding ponds at Carson NFH. Genetic tests indicated that these fish were a mixture of upper Columbia and Snake River populations passing Bonneville Dam. These fish were spawned and their progeny reared and released on site. This run of spring Chinook has continued to thrive ever since.

Up until 1998, Carson NFH released up to 2.0 million smolts annually to maintain this run of spring Chinook. However, research completed in the early 1990's indicated that spring Chinook reared at Carson survived better and had higher returns when raised at lower densities. In response to this study, rearing densities and releases were reduced. Currently, the hatchery produces 1.47 million smolts.

The hatchery gets all of its water from Tyee Creek which originates from Tyee Springs one-half mile northeast of the hatchery. The springs flow year round with the highest flows occurring in winter and the lowest flows during the late summer. The water is clear, oxygen saturated with a relatively stable temperature of 44˚ Fahrenheit. Water from Tyee Springs is used for egg incubation and domestic water use. There is a resident brook trout population in Tyee Creek above the hatchery. A screen prevents brook trout from entering the hatchery.

The facility consists of an administration building, hatchery building, a visitor center, shop/storage buildings, 46 raceways, two earthen rearing ponds, two adult holding ponds, a spawning shed, and four residences.

Fish Production

The salmon runs in the Columbia River Gorge tributaries, part of the middle Columbia River basin, were of prime importance historically to the Native Americans (Yakama Nation ceded territory) and to the sport and commercial fisheries who now utilize this resource. While the development of the Columbia River hydropower system provided much needed energy, it had a devastating impact on the salmon fishery. Habitat destruction, dam construction and overharvest have all led to the decline the number of salmon returning to the Columbia Basin.

The current spring Chinook salmon propagation program at Carson was developed to help mitigate for fisheries lost due to the construction and operation of the Columbia River hydropower system. It has also become an important component in meeting federal trust responsibilities to the Native American communities with fishing rights in the Columbia Basin. The spring Chinook salmon released from Carson into the Wind River help fuel an intensive tribal fishery. The reliable return of adult spring Chinook to the Columbia River and the Gorge tributaries is recognized as a major contributor to these popular fisheries. In addition, spring Chinook salmon reared at Carson are transferred as pre-smolts for acclimation in the South Fork Walla Walla River for the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and to the Hood River for the Confederated Tribes of the Warm Springs Reservation (CTWSR). Both tribes release these fish following acclimation to continue tribal reintroduction efforts.

The current production program is guided by specific fish production goals identified in the recently negotiated 2008-2017 United States v. Oregon Management Agreement. One of the purposes of this agreement was to provide a framework to protect and enhance salmon runs in the Columbia River while allowing harvests for both treaty Indian and non-treaty fisheries in the ocean and Columbia River Basin. Several means were identified to accomplish this purpose including habitat enhancement, dam modifications to allow for fish passage through and above, harvest regulations and artificial propagation.

Carson NFH is also participating in a comparative study of Hood River spring Chinook reared at three different hatchery facilities prior to being moved to the West Fork Hood River for final acclimation and release. The primary purpose of this study is to determine the most long-term biologically sound and cost effective spring Chinook salmon strategy for restoring a spring Chinook run to the Hood River Basin. Eggs from the Parkdale Fish Facility in Oregon are delivered and reared at Carson before transferring to the Moving Falls acclimation site on the West Fork Hood River.

Fish production goals set by these agreements specific to Carson NFH include:

- 1.17 million yearling spring Chinook released on site
- 250,000 spring Chinook pre-smolts for transfer, acclimation, and release in the South Fork Walla Walla River
- 45,000 spring Chinook pre-smolts for transfer, acclimation, and release into Hood River.

The fish on Carson are reared for up to 17 months prior to release so during parts of the year there may be up to 3.0 million fish on station.

Brood Year 2010 Fish (Lot SCS-CAW-10-Ca-36) Released during 2012

Species	Number	Weight (lbs)	Release Site	Agency	State	Program Goal	Date
Spring Chinook	1,126579	62,692	Wind River	USFWS	WA	Mitigation	4/16/2012
Spring Chinook	249,196	13,632	S.F. Walla Walla River	CTUIR	OR	Mitigation	4/1-2/2012
Spring Chinook	47,965	1,179	Hood River	CTWSR	OR	Mitigation	2/22/2012

Brood Year 2011 (Lot SCS-CAW-10-CA-38)
Lot 38 is the progeny of the adults that returned and were spawned in August of 2011 and they will be transferred or released in the spring of 2013.

Number and Size of Brood Year 2011 Fish (Lot SCS-CAW-10-Ca-38) on Station on September 30, 2012

Species	Number	Weight (lbs)	Release Site	Length (in)	FPP	Program Goal	Agency
Spring Chinook	1,125,876	29,168	Wind River	4.42	38.6	Mitigation	USFWS
Spring Chinook	249,343	7,579	S.F. Walla Walla River	4.65	32.9	Mitigation	CTUIR
Spring Chinook	43,271	972	Hood River	4.21	44.5	Mitigation	CTWSR

After the last of the smolts are released in April, the hatchery is prepared for the returning adults who start to appear in May. The adult ponds are cleaned and the fish ladder is opened on May 1. Adults are counted daily as they return. Our current escapement goal (number of adult fish needed to spawn) is 1,400 adults to allow for the expected male to female ratio of 45% to 55%, respectively, so that 500 females can be spawned with 500 males to maintain the 1:1 spawning criteria as close as possible. The eggs collected from this year's spawn represent Brood Year 2012 (Lot SCS-CAW-10-CA-40) that will be released as smolts during the spring of 2014.

Last year was a low year as only 1,612 adults returned to the hatchery compared to an average of 2,597 over the five previous years. An estimated 2,350 including 50 jacks were caught by sport anglers at the mouth of the Wind River and an additional 272 adults were caught by tribal members of the Yakama Nation out of the Wind River.

Species	Total Adult Return	Surplused[1]		Adult Fish Spawned		Eggs Collected	% Eye-Up
				Male	Female		
Spring Chinook	1,612	313		455	500	2,164,297	96.22

[1] Surplused adults were provided to the Northwest Harvest Food Bank

Adults are held in the adult holding ponds.

Comparative Feed Study

In several studies, several variables such as spring growth rate, gill ATPase activity, and plasma IGF-I concentration can have a significant effect on smolt to adult returns. Additionally, hatcheries that have consistently low water temperatures year-round and slower spring warming may not support rapid growth in the spring. In turn, these low temperatures can directly impact spring growth rate, gill ATPase activity and plasma IGF-I concentration. This scenario is applicable to the Carson NFH where the water temperature in Tyee Creek will only vary by a few degrees throughout the year.

In an attempt to identify a possible way to increase the spring growth rate, we conducted a small pilot study to determine if there are any significant differences in smolt physiology and morphology between fish fed Bioclark's fry and Bio Vita Fry.

Four raceways were, two in the upper bank and two in the lower bank were fed Bio Vita Fry feed. Four other raceways were selected by random as controls and were fed Bioclark's fry feed. Three 15 fish samples were taken from each raceway every two weeks during the study beginning on 06 February prior to the start of experimental feeding. Gill filaments were collected from the first 15 fish sampled to measure Na^+/K^+ ATPase activity. Blood samples were taken from the second 15 fish sample to measure plasma IFG-I. All gill tissue and blood samples were analyzed by the Abernathy Fish Technology Center. All fish from the three samples were weighed and measured.

Fish biologist David Burbank weighs a fish to monitor growth. Growth of the fish was monitored for two months during the feed evaluation study.

Overall, fish fed Bio Vita appear to have grown better (length and weight) than the fish fed Bio Clark's in both the upper and lower banks of raceways evaluated. However, it does not appear that there was a significant difference between the two groups of fish. Without a significant difference in growth or other physiological benefits enhancing smoltification, it appears that there just wasn't enough of a difference to justify the cost increase of feeding Bio Vita Fry.

In 2013, we plan on conducting a longer feed comparison study between Bio Vita Fry and Bio Clark's Fry. This study will be on a smaller scale with fish kept in smaller tanks in the hatchery building but will be longer in scope (one year versus 10 weeks).

Fish Health Management

Managing fish health in an intensive culture environment can be challenging. That is why we work closely with the Fish Health Center (FHC) in Willard, WA to ensure our fish stay healthy. Spring Chinook are particularly susceptible to Bacterial Kidney Disease (BKD) (*Renibacterium salmoninarum*). Outbreaks of BKD have caused large fish losses in the past and have necessitated the heavy use of antibiotics during the rearing process. The use of ELISA has led to a dramatic reduction in BKD outbreaks and the use of antibiotics at the hatchery.

During spawning, staff for the FHC will collect kidney samples from all spawned spring Chinook females to help determine the incidence of BKD. The enzyme linked immunosorbent assay (ELISA) laboratory technique identifies the risk potential of BKD from the progeny of all spawned females. Progeny from females with a high titer (risk) of BKD can be identified and culled. This has led to a reduced incidence of returning high titer adults, allowing hatcheries to cull eggs of not only fish with high titer but any eggs from females with detections over the Not Detected and Very Low categories. This has almost eliminated outbreaks of BKD at the hatchery and so the use of antibiotics has been greatly reduced. Since less eggs need to be culled, less females are needed to meet our egg take requirement and so the number of females spawned was reduced starting in 2011 from 540 to 500, leaving more fish available for the tribal and sport fisheries.

The use of erythromycin injections is also used to reduce the number of adults carrying the BKD pathogen before spawning. Historically, the adults were injected twice over a two month period but studies have shown that one injection was just as effective as two and so this year the adults were injected only once with no noticeable difference in higher titer females from past years when adults were injected twice.

The use of erythromycin injections coupled with ELISA has greatly reduced the outbreak of Bacterial Kidney Disease and overall antibiotic use at the hatchery.

Enzyme Linked Immunosorbent Assay (ELISA) 2009-2012 Results

	Titer (Risk) Level						
Year	Not Detected	Very Low	Low	Med	High	Very High	Total
2009	341	186	4	4	1	4	540
2010	394	104	31	4	2	5	540
2011	331	149	10	3	3	4	500
2012	417	77	4	1	0	0	499

Funding

The current spring Chinook salmon propagation program at Carson is entirely funded by the Mitchell Act, funding received from NOAA-Fisheries. The Bonneville Power Administration provided funds needed to cover the costs for rearing Chinook salmon smolts for the Hood River restoration program. The U.S. Fish and Wildlife Service (USFWS) provides maintenance funds for maintaining the facillity.

Fund Source	Total
NOAA - Mitchell Act	$563,732
Bonneville Power Administration	$11,781
USFWS Deferred Maintenance	$85,938
Total	**$661,451**

Administration

In 2011, Carson NFH was part of a significant reorganization that involved three other federal fish hatcheries (Spring Creek, Little White Salmon, and Willard) that formed the Columbia River Gorge NFH Complex. All four hatcheries were complexed and are now supervised by the Complex Manager. This had the benefit of reducing redundancies and capturing efficiencies allowing for the reduction of staff at Carson without impacting production. Through the sharing of staff and resources, the Columbia River Gorge NFH Complex (Complex) produced over 20 million salmon. The administrative headquarters are located at the Spring Creek NFH.

Staff

The following employees are those whose regular duties involved administration or operations of the Complex or Carson NFH. Those stationed at Spring Creek and Little White have responsibilities covering all four hatcheries within the whole Complex, not just Carson NFH. There are many other staff members not listed from the other hatcheries in the Complex that have helped with operations at Carson when things got tight like during adult spawning. Without them, Carson NFH would not have been successful in achieving its obligations.

Employees of the Columbia River Gorge Complex with operational or administrative responsibilities for Carson NFH

Name of Employee	Position Title	Duty Station	Grade	Period Worked
Speros Doulos	Complex Manager	Spring Creek NFH	GS-482-13	10/1/12 – 9/30/12
Cheri Anderson	I&E Specialist	Spring Creek NFH	GS-1001-11	10/1/12 – 9/30/12
Jennifer Rowlen	Park Ranger	Spring Creek NFH	GS-025-06	10/1/12 – 9/30/12
Lori Orr	Administrative Officer	Little White Salmon NFH	GS-341-09	10/1/12 – 9/30/12
Debra Hogberg	Fisheries Program Asst.	Spring Creek NFH	GS-303-07	10/1/12 – 9/30/12
Erik Anderson	Fisheries Program Asst.	Little White Salmon NFH	GS-303-06	10/1/12 – 1/14/13
Larry Zeigenfuss	Hatchery Manager	Carson NFH	GS-482-12	10/1/12 – 9/30/12
David Burbank	Fish Biologist	Carson NFH	GS-482-07	10/1/12 – 8/28/12
Jeff Blaisdell	Maintenance Mechanic	Carson NFH	WG-4749-09	10/1/12 – 9/30/12
Randy Berge	Motor Vehicle Operator	Carson NFH	WG-5703-06	10/1/12 – 9/30/12
Nathan Sweeney	Fish Culturist	Carson NFH	WG-5048-05	10/1/12 – 9/30/12

Volunteers

Carson NFH would have a much more difficult time successfully meeting its mitigation obligations while providing visitors with a rewarding experience without dedicated volunteers. Barbara Brown came out from Florida and volunteered from May 9, 2012 to August 8, 2012. Barbara was in charge of visitor services, providing tours and manning the visitor center. Kathy and Will Waldow arrived from Creston National Fish Hatchery on July 2, 2012 and volunteered until September 12, 2012. Kathy and Will took care of the grounds keeping duties for the hatchery and residential areas including keeping the restrooms well stocked and clean. By assuming the visitor center and grounds keeping duties, these volunteers freed up hatchery staff to spend more time on fish husbandry.

Spawning time is a very busy time and we had seven other volunteers help out. Without their help, spawning would have taken more than three days. Volunteering is a great way for the community to get involved and we encourage anyone interested to stop by.

Training

Staff at Carson NFH attended the following training courses:

- Forklift Training – entire staff
- Fisheries Academy – David Burbank
- Supervisor Training, the First 40 Hours – Larry Zeigenfuss
- First Aid/CPR – Entire Staff
- FBMS – Larry Zeigenfuss

Meetings and Events

Hatchery Evaluation Team

The Hatchery Evaluation Team (HET) was formed to ensure that the hatchery is operating in a manner consistent with its intended purpose. The founding principles of the HET are identified in the December 2007 Hatchery Review Final Report. This report identified issues and threats facing each of the gorge hatcheries and provided ideas on resolving or mitigating these issues and threats. The HET is a forum for team members to discuss and share ideas and resources to address these issues. The HET is made up of representatives from Carson NFH, Lower Columbia Fish Health Center, Columbia River Fisheries

Program Office and the Abernathy Fish Technology Center. The Carson NFH HET met on December 16, 2011 to discuss hatchery operations and issues.

To increase efficiency and decrease travel time, it was determined that all of the complex hatcheries HET meetings should be combined into one HET meeting. The first Columbia River Gorge NFH Complex HET meeting was held at Carson NFH on August 1, 2012. This turned out to be a great idea, saving travel time on a lot of the partners who are stationed outside of the gorge.

A Hatchery Coordination Team (HCT) meeting was held on April 17th at Spring Creek NFH. The HCT is made up of core HET members along with other partners outside of the USFWS. This meeting serves to update partners and funding agencies on hatchery operations and program accomplishments. This year's HCT meeting was a dual meeting with Spring Creek to address dual interests among the partners. This year's attendees included members of Carson and Spring Creek HET's, the Army Corp of Engineers, NOAA Fisheries, and the Confederated Tribes of the Warm Springs Reservation.

South Gifford Pinchot Collaborative Group

The mission statement of the South Gifford Pinchot Collaborative Group (SGPCG) states that it "is a community based partnership that participates in the development, facilitation, and implementation of projects that enhance economic vitality, forest ecosystem health, recreation, and public safety on the south end of the Gifford Pinchot National Forest and surrounding communities." The intent of the SGPCG is to allow for forest development projects while addressing concerns of everyone on all sides with the benefit of reducing litigation and allowing for community members to learn about projects and voice concerns or show support. The group meets once a month to discuss upcoming projects and issues within the lower Gifford Pinchot NF.

Out of concerns for watershed health and forest use around Tyee Creek and Tyee Springs, Carson NFH joined the SGPCG in April of 2012. Since joining the SGPCG, Carson NFH has become an active member learning about projects and working with partners to meet the goals of the SGPCG.

Steelhead Management Gorge Work Group

The Wind River is home to the Lower Columbia River Steelhead that was listed as threatened under the Endangered Species Act in 1998. The purpose of the Steelhead Work Group was to develop a regional management plan for the Lower Columbia River Steelhead. Six meetings were held from February 2012 to September 2012 to identify and discuss issues that needed to be addressed in the management plan. Carson NFH joined the group to provide and input and information concerning hatchery operations and help out with the development of the plan any way we can. Carson NFH will continue to be involved in the process until the plan can be finalized.

Hatchery Maintenance Projects

Hatchery Conversion from spawning Buckets to Trays

When the Complex was formed in 2011, Carson differed from the other gorge hatcheries in that eggs were incubated in buckets instead of incubation trays. In 2012, Carson NFH remodeled the hatchery building and converted all egg incubation to trays. This greatly increased the efficiency of spawning operations by reducing the number of people needed in the incubation building during spawning operations and the amount of space needed to incubate eggs. Another benefit was since the other

gorge hatcheries already used incubation trays, staff from those other stations could easily help out in the incubation building during our spawning operations without having to learn new methods.

The conversion to incubation trays from buckets has greatly increased efficiency by saving both space and personnel needed during spawning time. Now only three people are needed to process the eggs while before it required five people.

Hazard Tree Removal

When the adults return, they swim up a fish ladder from Tyee Creek and into the adult holding ponds. Adjacent to the adult holding ponds are a spawning shed with a lift station and an electric anesthesia unit. The adults are pushed to the lift station using a $500,000 crowder. During a big winter storm in January, the top of a large cottonwood tree broke off and landed next to the spawning shed. This piece was approximately 30 feet long and six inches in diameter and could have potentially severely damaged the spawning shed and/or equipment within it. This was an eye opener as to the risk that several large cottonwood trees posed to the adult holding ponds, the adult crowders, and the spawning shed. So nine trees were identified as severe hazards and a contract was awarded for their removal.

Hazard trees threatening the adult holding ponds and crowders were professionally removed.

Pavement Rehabilitation

Carson NFH gets a lot snow and ice during the winter which can be rough on asphalt. A total of 5,895 ft^2 was identified as being in urgent need of repair and a contract was approved for the repaving of these sections. Also a 480 ft^2 parking area was paved. This area was originally dirt and got extremely muddy and rutted during the wet periods.

Shade Covers

Shade is very important for Chinook for they are vulnerable to sunburn and secondary infections. Also avian predators such as kingfishers and blue herons prey on them and cause stress in the rest of the fish. All of this has an impact on behavior, feeding, and growth thus reducing overall survival after release. A contract was awarded to Northern Management for the construction of shade covers over the upper bank of raceways. The upper bank was the only bank of raceways not covered by a structure.

The shade covers were patterned after the ones at Willard NFH and Quilcene and consist of a metal frame with tarps tied over them.

The covers are designed to allow snow and rain to fall off the side and into the raceways so they won't collapse.

Other projects include:

- Kitchen remodel for Quarters #1 completed.
- Completion of the replacement of oil furnaces with heat pumps in the admin and hatchery building. This project was started in 2011.
- Installment of otter screen in outlet channel.
- Head box board replacement for upper and middle bank of raceways.
- Restoration of wildlife habitat on hatchery grounds and quarters area.
- New graveled parking area for tribal anglers.

Information and Education

By joining the Columbia River Gorge NFH Complex, Carson NFH received major support in our outreach efforts from the Columbia Gorge Information and Education Office and thus was able to accomplish things that would not have happened as a stand-alone station.

Visitor Center

One of these accomplishments was the renovation of the Carson NFH Visitor Contact Station in June 2012. New interpretive panels and displays were installed that not only inform visitors of hatchery operations and hatchery history, but also include interesting facts about the Gifford Pinchot National Forest and the Mount St. Helen's National Volcanic Monument. The contact station was staffed by volunteers from May – September.

These new displays comply with the Americans with Disabilities Act, increasing access to their information. A total of 881 visitors including 207 children were recorded in the stations register.

Salmon in the classroom

The Columbia Gorge Information and Education Office is very active in the local schools. Three hundred eggs from Carson NFH were provided to Carson Elementary where they were reared in aquariums equipped with chillers. The students reared the fry until they were buttoned up (their yolk sac is absorbed) and then released into Tyee Creek here at the hatchery. During that time the students were given tours where they learned about salmon culture and ecology.

Fishing Days

Carson NFH holds two free fishing events every summer shortly after spawning. These events have become very popular within the local communities. This year we held our 14th Annual Carson NFH Disabled Fishing day (70 participants) and our 14th Annual Kid's Fishing Day (700 participants).

Catchable size rainbow trout were provided by the Washington Department of Fish and Wildlife Goldendale Fish Hatchery and stocked into the adult holding pond.

Volunteers and staff cleaned the fish for participants to take home.

Facebook
Carson NFH, along with Spring Creek NFH and Little White Salmon NFH, has developed our own facebook page as a resource to share news, happenings, and events with the public as well as teach them about salmon ecology and culture. The webpage can be found at:
http://www.facebook.com/pages/Carson-National-Fish-Hatchery/

Other Public Outreach Events Carson NFH participated in include:

- Water Jam'11 in Underwood, WA
- United Cerebral Palsy Fishing Derby at Little White Salmon NFH
- Spring Creek NFH Open House
- Wenatchee River Salmon Festival, Leavenworth, WA
- Skamania County Fitness Fair, Stevenson, WA
- Girl Scouts Hatchery Tour

Fish and Egg Distribution Summary

Carson National Fish Hatchery			Period Covered: October 1, 2011 through September 30, 2012			
Species	Fish or Egg Number	Fish		Management Area	State	Agency
		Total Weight	Size			
SCS-CAW-10-CA-38	300	0.36	Eyed Egg	Carson Elementary	WA	Skamania County
SCS-DRW-10-CA-37	47,956	1,719	4.92	West Fork Hood River	OR	CTWSR
SCS-CAW-10-CA-36	249,196	13,632	5.67	SF Walla Walla River	WA	CTUIR
SCS-CAW-10-CA-36	1,126,579	62,692	5.71	Wind River	WA	USFWS

Hatchery Production Summary

Carson National Fish Hatchery				Period Covered: October 1, 2011 through September 30, 2012							
Species Strain and Lot Number	Fish on Hand During FY12			Growth by Time of Release/End of Fiscal Year							
	Time on Station	Number	Weight	Size		Density Index	Weight Gain	Feed Expended		Conversion for Year	Percent Survival
				Length	FPP			Pounds	Costs		
SCS-CAW-10-CA-36	Oct - April	1,375,775	76,547	5.36	18.0	0.18	38,011	38,528	$37,524.02	1.01	99.9
SCS-DRW-10-CA-37	Oct - Feb	47,956	1,719	4.63	27.9	0.15	619	720	$671.22	1.16	99.7
SCS-CAW-10-CA-38	Oct – Sept	1,384,761	37,940	4.23	36.5	0.18	37,940	31,870	$38.010.84	0.84	97.2
SCS-DRW-10-CA-39	Oct - Sept	43,188	1,138	3.96	44.5	0.10	972	1,074	$1,377.05	1.10	96.0
Total/Average		2,851,44	117,344	4.545	31.72	0.15	77,542	72,192	77,583.13	1.02	98.2

Wild Broodstock Summary

Carson National Fish Hatchery				Period Covered: October 1, 2011 through September 30, 2012				
Species/Strain	Total Number Returned	Number Spawned		Number Surplused	Number of Eggs Taken		Females Culled for ELISA	Eggs Retained for Production
		Females	Males		Number	% Eyed		
Carson Spring Chinook	1612	500	455	313	2,164,297	96.22		1,608,000

Chemical Use Summary

Chemical	Purpose	Therapeutic Treatment	Total used	Total Cost
Formalin	Parasite and fungus control on adults	200 ppm for 1 hour 3X a week	486 gallons	$3,581.82
Formalin	Fungus control on eggs	1667 ppm for 15 min 3X week	53.05 gallons	$390.98
Formalin	Parasitic treatment in two raceways	1 hour bath at 150 ppm – one time treatment	2.52 gallons	$18.57
Ovadine	Prevent infection while water hardening of eggs	30 min bath at 50 ppm	2.5 gallons	$71.88
Virkon	Disinfection of equipment	Equipment is sprayed or dipped	17.5 lbs (216 gallons)	$119.25
Erythromycin	Prevent BKD outbreaks in adult salmon	1.2 ml per 2 kg of body weight injected – one time treatment	2,200 ml	$220.00